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June 11, 2003

Ms. Aileen Adams, Chair
California Building Standards Commission
915 Capitol Mall, Suite 200
Sacramento, California 95814

Commissioners
California Building Standards Commission
2525 Natomas Park Drive, #130
Sac, CA 9583-2936

Dear Chairperson Adams and Commissioners:

Attached please find a copy of the "Report of the Review of the NFPA 5000 and International Building Code and International Residential Code for use as the Reference Document of the 2004 California Building Code", prepared by the Department of Housing and Community Development, Division of Codes and Standards, for the Code Change Committee meeting of June 11, 2003.

As the text indicates, the report covers the background related to the building code selection decision, the decision-making process, and our ultimate recommendation for the choice of the reference document for the 2004 California Building Code.

For further information or assistance, please feel free to contact Jim McGowan at (916) 445-9471.

Sincerely,



Matthew O. Franklin

Director.

Enclosures

cc Stan Nishimura, Executive Director, CBSC
Interested Parties

I. Background

Since 1963, California has used the Uniform Building Code (UBC), prepared by the International Conference of Building Officials (ICBO), as the base model for the California Building Code (CBC). In 1994, the ICBO started its merger with the Building Officials and Code Administrators International (BOCA) and the Southern Building Code Congress International (SBCCI) to form the International Code Council (ICC). As a result of this merger, the ICBO announced that they would no longer publish the UBC after the 1997 edition. Instead, the newly formed ICC would jointly publish the International Building Code (IBC), which represents the combination of the codes prepared by the various entities involved in the merger. In addition, the ICC would also publish the International Residential Code (IRC) which is based on the BOCA One- and Two-Family Code, which has not been previously used in California.

Starting in 1999, the California Department of Housing and Community Development (the "Department") and the other code proposing agencies¹ met as the 2000 Code Partnership to determine whether to use any or all of the new International Codes as California's base codes. During this period, the Code Partnership met extensively with interested stakeholders, customers and other public entities. In July 2000, the Commission voted to accept the recommendation of the 2000 Code Partnership to use the IBC and IRC as California's model building codes for the 2001 code adoption cycle. However, because not all of the adopting agencies had completed their review process, the Commission republished the 1998 CBC (which used the no-longer published 1997 UBC as the base) with new amendments for the 2001 CBC code adoption cycle.

The National Fire Protection Association (NFPA) is a highly respected organization with a considerable history in writing standards to improve fire and life safety in buildings and facilities. One such example is NFPA 101, which deals with life safety from fire and like emergencies with features to minimize danger from fires, smoke, fumes or panic before buildings are vacated. The NFPA recently partnered with the International Association of Plumbing and Mechanical Officials (IAPMO), the Western Fire Chiefs Association (WFCA), and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). The Department has a longstanding and positive relationship with NFPA and its partners, and adopted NFPA's National Electrical Code (NEC). The Department recently proposed the adoption of the 2002 NEC as the base document of the 2004 California Electrical Code (CEC). In October 2002, the NFPA 5000 was published as the NFPA's first complete building code.

Pursuant to Health and Safety Code section 17921, the Department is responsible for proposing the adoption of building standards to the Commission

¹ The other code proposing agencies are the Division of State Architect, the Office of Statewide Health Planning, the State Fire Marshall (the "SFM"), and the Building Standards Commission (the "Commission").

The standards shall provide for the protection of public health, safety and general welfare of occupants and govern the erection, construction, enlargement, conversion, alteration, repair, occupancy and use of all hotels, motels, lodging houses, apartment houses, and dwellings as well as the buildings and structures accessory thereto. Section 17922 of the Health and Safety Code directs the Department to incorporate by reference substantially the same requirements as are contained in the most recent editions of the national uniform building codes.

For the next code adoption cycle, all parties appear to agree that it is no longer appropriate to continue using the out-of-date 1997 UBC as California's base model code. Presently, there are two published building codes as possible alternatives available for consideration. They are:

The 2003 NFPA 5000 Building Construction and Safety Code; or

The 2003 International Building Code/International Residential Code (IBC/IRC).

II. The Decision-Making Process

As will be discussed, the Department has met extensively with both code purveyors and wishes to extend its appreciation for the time, effort and courtesy shown by both the ICC and the NFPA. Both have been generous and patient in their presentations and in their responses to questions, both simple and detailed. Moreover, both purveyors have provided assurances that they will dedicate substantial resources for the training of contractors, building officials, plan-reviewers and other interested parties. The NFPA, in particular, is to be commended for their offer to provide free materials to all public officials should the NFPA be selected. The Department is satisfied that both organizations are credible, substantial, and would make effective partners.

The Department used the following four factors in its process for making a recommendation to the Commission.

First, the primary consideration for selection must be the degree to which the model code meets the goal of ensuring the construction of safe buildings for the occupants.

Second, the Department looked to the ease of use for the regulated public, which includes homeowners, contractors, building officials, plan reviewers and inspectors, architects and engineers.

Third, the Department looked to the cost impact of the competing codes. This factor includes both the cost impact on the construction of decent,

safe, accessible, and affordable housing and the actual cost of implementing the codes themselves.

Fourth, and finally, in evaluating new choices that will be imposed on the regulated public, the Department needed a level of confidence that the new product has been adequately field tested. Therefore, while certainly not conclusive, the field experience of like jurisdictions was an item of consideration.

III. The Process Used in Evaluating the Competing Codes

At the December 3, 2002, meeting of the Commission, the Department informed the public of the process it would be using to review and evaluate the two competing model building codes. It indicated at that time that a detailed review of the NFPA 5000 would take place from November 2002, through January 2003 followed by an equally detailed review of the IBC/IRC from February through April 2003. Both codes would be reviewed in conjunction with a comparative review of the 2001 CBC. This process was reiterated at several subsequent public meetings to ensure public awareness of the process and timeframes imposed so interested parties could provide input during this time of deliberation.

The process utilized by the Department included the acceptance of public input from interested parties throughout its consideration. Departmental staff and/or management has met with all parties upon request,² including state agencies, as well as attending public meetings in which discussion of the proposed adoption of model codes took place.³

The Department also received and reviewed a large number of documents from many interested parties. The Department gave great consideration to all stakeholders' input during the extensive review and evaluation of each document and/or statement provided.⁴

² Meetings with interested parties included: California Building Industry Association (CBIA); NFPA; ICC; California Building Officials Association (CALBO); IAPMO; the Department's Focus Group on Disabled Access; and the SFM.

³ Public meetings attended involving open discussion of model code adoption include: CALBO; SFM's Fire Life Safety Building Standards Advisory Board and State Fire Services Board; Division of State Architect (DSA); Commission; the Coordinating Council; local Building Official Chapters; and local Plumbing and Mechanical Official Chapters.

⁴ A partial list of documents follows: State of Oregon Comparative Analysis; Comparative Analysis from the National Association of Home Builders; Comparative Analysis from CALBO; Comparative Analysis From CBIA; Comparative Analysis of Fire and Panic Safety issues "Operation Code Comparison" from the SFM; Comparison of IBC & NFPA Fire Safety Provisions: Portland Cement Association; Position Papers from League of Cities' City Managers; Position Papers from League of Cities Fire Chiefs; Position Papers from Cities and Counties; and Local Resolutions Supporting Respective Codes.

Finally, over the course of May and until the preparation of this report the Department's executive management has met with representatives of the ICC; NFPA; CBIA; IAPMO and the SFM. Departmental senior staff and attorneys have been briefed by the representatives of the competing codes, who have patiently and cordially responded to every question.

IV. Additional Background and Salient Characteristics of Each Code

The following are significant points highlighted by the respective code purveyors.

NFPA 5000

1. The NFPA 5000 is organized based on occupancy. This organization is consistent with that used in the NFPA's Fire and Life Safety Code which used in California for certain health related facilities pursuant to federal Medicaid and Medicare requirements.
2. The NFPA relies on established reference documents as their building standards. In numerous instances, this includes references to several other sources with direct and specialized knowledge. On the whole, these reference standards are generally unmodified by the NFPA.
3. The NFPA allows for performance based on construction methods.
4. NFPA uses the American National Standards Institute (ANSI) consensus process for the development of its codes. This process allows any interested party to participate throughout the development of the codes and standards contained therein. In the development of the codes, no single interest group may dominate, and voting is not restricted to certain classes of membership. Each code development committee includes a balance of all affected interests. The committees hear proposals, act on public comments, and prepare a report for the general membership. The NFPA codes are developed by more than 250 different technical committees with member selection based on technical expertise, professional standing, commitment to public safety, and the ability to bring to the table the point of view of an affected interest. Technical committees consist of up to thirty volunteer voting members representing a variety of interests, including the fire services, code enforcement, business, industry, insurance, trade or professional associations, user groups, and federal, state and local government officials. No more than one-third of the technical committee may be from the same interest group, and they must reach a consensus by at least a two-thirds vote of the voting members in order to take action. Membership votes are tabulated and used in an advisory vote to the various technical committees.

The IBC/IRC

1. For conventional residential construction of 3-stories or less,⁵ the IRC contains almost all the prescriptive standards necessary for design, construction and inspection. This allows the majority of the Department's regulated public to find all the needed standards within the same code book.
2. The IBC/IRC are organized and formatted in the same manner as the UBC, which has been the basis for the CBC for several years. Accordingly, although the IBC/IRC would be new to California, the organization of the codes is familiar to the regulated public.
3. Because the IBC/IRC have been adopted on a statewide basis in 25 states, they have, therefore, been field tested to some degree and have gone through at least one cycle of input and improvement.
4. Because there are, at least, some historic connections between the former UBC and the current purveyors of the IBC/IRC, the training and certification processes are further advanced in development and are familiar to the regulated public.
5. The ICC uses the Governmental Consensus Process for the development of its codes. This process is designed to allow any interested individual or group to submit a code change proposal and participate in the proceedings in which it and all other proposals are considered. The debate and broad participation occurs before a committee comprised of representatives from across the construction industry, including code regulators and construction industry representatives. The process is designed to ensure a consensus of the construction community in the decision-making process. Voting membership is limited to federal, state or local code adoption and/or enforcement officials. The results of all votes are published in the report of the ICC code development hearings. Voting members review the recommendations of the ICC code development committees at their annual conference and determine final actions. Following consideration of public comments, each proposal is individually balloted by the eligible voters. The final action on the proposals is based on the aggregate count of all votes cast. The process attempts to ensure that the international codes will reflect the latest technical advances and address the concerns of those affected throughout the industry through an open process.

⁵ Although the IRC applies to 3-story residences, California's Business and Professions Code requires the use of a licensed design professional for plan preparation above 2 stories. (See Bus. & Prof. Code section 6737.1.)

V. Application of the Department's Priorities

The Department has carefully weighed the representations made by each of the code bodies regarding the respective merits of the competing codes and has conducted its own internal review and comparison. The following are the Department's conclusions:

Safety

As noted earlier, the first, and highest priority for the Department, is to select a model code that ensures the health and safety of California's residents.

After careful review, the Department has concluded that although the two competing codes take different paths in organization and style, with appropriate California amendments and enforcement, either model code will adequately meet the essential requirements for the protection of the public health, safety and general welfare.

One potentially significant difference in terms of health and safety discussed during the State Fire Marshal's deliberative process was safety concerns for firefighters and emergency safety workers. The Department has considered this issue as part of its review as an important and critical safety issue along with others, such as structural safety, light and ventilation, and other critical design features. The Department believes that with the active participation of the Fire Marshal's office during the amendment process, California can ensure the greatest possible fire and panic safety amendments to ensure firefighter and emergency worker safety using either model code. Therefore, this issue alone does not tip the balance in terms of health and safety to one code or another.

However, as will be discussed, the Department recognizes that the regulated public and the city officials that will have to enforce the CBC are partners in compliance. As such, the ease of use and cost of the CBC could have a significant impact on code compliance and, therefore, the health and safety of the occupants.

Ease of Use (Impact on the Regulated Public)

In weighing the choice of a model code, the Department is acutely interested in the potential impacts of the code on its regulated public, i.e., California's homeowners, contractors, building officials, plan reviewers and inspectors, architects and engineers. After substantial review, the Department has determined two significant factors in influencing this criterion:

a.) Prescriptive versus Reference Standards

On this issue, the ICC and the NFPA have taken distinctly different paths. The NFPA adopts the use of incorporating scientifically-based reference standards. These outside references typically provide various formulas, tables and charts to assist the engineer or architect in the design calculations and the preparation of working drawings. There is considerable logic in this approach since it ensures the use of the scientific standards that are developed by those organizations that possess specialized expertise.

For example, to determine required structural loading, a user is referenced to six different potential standards, one or more of which might be applicable to a particular type of construction under consideration. The user would select the appropriate reference material, locate the necessary referenced material, and use the material contained therein to perform the relevant calculations.⁶

While there are virtues to this approach, for a large number of relatively straightforward conventional construction projects, it is a more difficult process because it involves a number of steps and the likely use of a professionally licensed engineer and/or architect.

On the other hand, the ICC uses performance-based prescriptive standards. This approach, built on past experience, looks at many routine construction activities and provides the actual construction standards to be used without the need for engineered design calculations unless needed for a particular component. If the user follows these self-contained standards, they are assured that the structure being built, rehabilitated, or altered is code-compliant, and is built to health and safety standards that have been developed through time and experience.

The ICC builds these prescriptive standards for conventional construction into both the IRC (in California, applicable to 1-, 2-, and 3-story single-family homes or duplexes) and the IBC (in California, applicable to 1-, 2-, and 3-story multifamily structures as well as hotels, motels and dormitories). (See footnote ⁵.)

In reviewing this “ease-of-use” consideration, the Department has looked at these two models as they would relate to the majority of the

⁶ Pursuant to Business and Professions Code section 6737.1, were the NFPA 5000 adopted as California's model building code, it would appear that such calculations and drawings would have to be prepared by a licensed engineer or architect. After extensive internal discussions, and discussions with representatives of the NFPA, the Department was unable to establish a satisfactory or conclusive answer to this question. It can only be assumed that local building officials and plan reviewers would suffer the same problems of interpretation on such a fundamental point as did the Department.

members of the regulated public that includes, as a very significant component, individual homeowners, small contractors, and the building officials, plan reviewers and inspectors in smaller communities. For this audience, the use of prescriptive standards provides a “recipe” for most straightforward construction projects and such a “cook-book” can undeniably be a useful tool.

The Department’s regulated public is primarily concerned with conventional construction. A majority of construction activities in California fall into the category of conventional construction (the construction, rehabilitation or alteration of single-family or two-family homes under two stories). For these activities, most homeowners and contractors, as well as building officials and plan reviewers are accustomed to applying readily available prescriptive standards that have been time-tested for health and safety essentials and that can be routinely applied.

Moreover, the Department believes that the selected code must be a good fit for the regulated public’s use. The availability and use of prescriptive standards, where appropriate, is easier to use and, therefore, the more logical choice. For this reason, the Department believes that the prescriptive standards contained in the IBC/IRC simply are the more common sense approach. As an approach to building standards, it is the better fit.

b.) Continuity of Organization, Style and Formatting

The NFPA’s use of reference and science-based calculations may be overly complicated for that portion of the regulated public that is involved in conventional construction, rehabilitation, alterations and additions. If the CBC becomes too hard to use, there is less likelihood of compliance. Similarly, to the extent that complexity contributes to confusion, the likelihood of inconsistent code compliance increases. Ultimately, such a consequence could lead to less safety for the residents and greater potential liability for contractors, who are already impacted by the high cost of construction insurance. Moreover, the regulated public has significant experience and investment in the current organization, formatting and style of the UBC (as contained in the CBC), which are continued in the IBC/IRC.

While California has never, and should not, shy away from making changes to new technologies or approaches to common problems, such changes should be associated with demonstrable benefits or enhancements to the public’s well-being. For example, there has been no assertion or evidence that a greater level of engineering will result in a significant benefit over the current practice of using prescriptive standards.

In the absence of a demonstrable benefit to change, there is a public policy benefit in meeting the regulated public's expectation of continuity and predictability. Continuity and predictability enhance consistency of application and compliance, and serve towards ensuring a stable marketplace.

In this case, the IBC/IRC most closely comports with the existing organization, format and style of the CBC and, therefore, most closely addresses this critical and reasonable expectation.

Cost

The Department also has evaluated the potential impact the model codes would have on the cost of housing.

Cost in terms of Affordability

It appears that the NFPA 5000 would increase initial costs of housing construction, particularly for smaller projects, by the extensive use of outside references. The use of science-based requirements necessarily mandates the use of more complicated calculations. Although the NFPA 5000 doesn't specifically mandate the use of a licensed engineer or architect to perform these calculations the Department believes that because of the complexity of the referenced sources it becomes a de facto requirement that such calculations be performed by an appropriately licensed professional. This is an additional expense that will impact housing affordability without a discernable benefit. In this regard, the IBC/IRC provide a significant cost advantage over the NFPA.

Cost in Terms of Time and Materials

In terms of cost related to time and materials, the Department concludes that the prescriptive standards contained within the IBC/IRC provide a significant benefit for the regulated public as well as the code enforcement partners at the local level.

There appears little question that for the average user, the IBC/IRC's system of prescriptive standards fills a need. The NFPA, as an alternative, would introduce a more complicated system requiring access or ownership of more books and reference materials, and would take more time to apply. To that extent, it adds cost to housing. For those projects that fit into the definition of conventional construction, the IBC/IRC represent a self-contained set of prescriptive standards that are, through experience, a known and efficient dynamic. The same efficiencies are

realized by the building officials, plan reviewers and inspectors responsible for ensuring that projects are built to code.⁷ Prescriptive standards provide, through experience, a known dynamic.

The Field Experience of Like Jurisdictions

The Department recognizes that this criteria has the potential for being a “catch-22” for new code purveyors and provides a significant “home court” advantage for codes that have been around longer, or, in this case, have been adopted elsewhere. Yet, competition is healthy and forces all parties to improve their products with the resulting benefits to the public. Recognizing the inherent disadvantage to the newer code, the Department does not find this to be a primary point in the evaluation. However, nor is it an irrelevant point for consideration. Before making any significant decision, a reference-check is always a consideration.

In this case, although the credentials of the NFPA are beyond dispute, the NFPA 5000 is a new product. While the NFPA has a long and honored history for developing critical fire and life safety standards, at this point in time, when a decision must be made, the NFPA 5000 remains a new and untested product as a building code. It has not yet been adopted by any other state and has only been approved in a single local jurisdiction. While the Department has no doubt that it has merit as a model code, it cannot be reasonably argued that it has been significantly field tested. The Department simply has neither the ability to reference-check the functionality or usability of the NFPA 5000 as a working document, nor to evaluate the public’s ability to absorb a significant change in organization and function.

Conversely, the IBC has been adopted as the model building code in 25 states with the IRC adopted as the model residential code in 19 states. The IBC’s pedigree stems from the UBC, which is familiar to its users nationally and within California. Currently, the IBC/IRC are in their second editions having had the opportunity to incorporate amendments based on real-life -application through its first update. Because the affected public is familiar with its format, organization, and style, the need for training, education, and resulting expenses will be minimized and this resulting ease of use will result in better code compliance.

In time, the NFPA may prove to contain significant and sufficient benefits to warrant overcoming the affected public’s expectation of continuity and predictability. The Department remains open to such considerations in the future.

⁷ The inability of the code officials within the Department, even with extensive consultation with the NFPA, to determine whether an engineer would be required under the NFPA is an example of an introduced complexity avoided by the availability of prescriptive standards.

VI. Conclusion

The review of the competing codes has been an arduous and difficult decision for the Department because there are two good choices prepared by dedicated and competent purveyors. Both are trusted and valued partners and either choice allows California to get to the desired result – the construction, rehabilitation or alteration of decent, safe, accessible, and affordable housing. Each offers a valuable insight and reasonable approach to the same laudable goal. The Department is satisfied that with the appropriate California amendments either choice would meet the 9 point criteria of Health and Safety Code section 18930.

Decisions have to be made and there are differences. The Department is satisfied that on the important priorities of ease of use and cost, the IBC/IRC have a significant advantage and, to the extent that this advantage works to the benefit of the regulated public, it enhances the likelihood of consistency of enforcement. For that reason, the Department recommends the use of the 2003 IBC/IRC as the basis for the California Building Code.